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(54) AQUEOUS COMPOSITION OBTAINED BY SOLUBILIZING OR DISPERSING OIL-SOLUBLE SUBSTANCE

(57)Abstract:

PURPOSE: To provide an aq. compsn. obtd. by solubilizing or dispersing an oil- soluble substance in an aq. medium and maintaining stability over a long period of time.

CONSTITUTION: In this aq. compsn. obtd. by solubilizing or dispersing an oil- soluble substance (B) in an aq. medium (C) with a solubilizing agent or a dispersing agent (A), the agent A is made of a polyglycerol fatty acid ester contg. a 12-14C satd. fatty acid by ≥ 70 wt.% of the total amt. of the constituents and having $\geq 20^{\circ}$ C cloud point. The agent A is used by 1-10 pts.wt. per 1 pt.wt. of the substance B. The aq. compsn. maintains stability over a long period of time and does not cause water-oil separation or precipitation during storage or distribution.

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CLAIMS

[Claim(s)]

[Claim 1] The oil solubility matter (henceforth B component) with a solubilizing agent thru/or a dispersant (henceforth A component) In the aquosity constituent which is solubilized thru/or distributed and becomes an aquosity medium (henceforth C component) A component 70% of the weight or more of the configuration fatty acid is saturated fatty acid of carbon numbers 12-14. And a cloudy point consists of polyglycerin saturated fatty acid ester which is 20 degrees C or more. The aquosity constituent which is comparatively characterized by the thing of A component in a constituent, and B component which it comes to blend A component in the range of 1 - 10 weight section to the B component 1 weight section and with which it solubilizes thru/or distributes and the oil solubility matter becomes an aquosity medium.

[Claim 2] The aquosity constituent which is characterized by coming it five or less to carry out pH and with which it solubilizes thru/or distributes and the oil solubility matter according to claim 1 becomes an aquosity medium.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the constituent which makes an aqueous medium solubilize thru/or come to distribute the oil solubility matter. It is related with the constituent with which it solubilizes thru/or distributes and oil solubility matter, such as a coloring agent, flavors, vitamins, an antioxidant, preservatives, antimicrobial agent, or fats and oils, becomes an aqueous medium in more detail.

[0002]

[Description of the Prior Art] Various kinds of goods which present the shape of liquid in ordinary temperature are making the aqueous medium solubilize thru/or distribute oil solubility matter, such as a coloring agent, flavors, vitamins, an antioxidant, preservatives, antimicrobial agent, or fats and oils, with an emulsifier in cosmetics, a deodorant, a bathing agent, an aromatic, a deodorant, food, physic, etc. conventionally. However, the oil solubility matter which the aqueous medium was made to solubilize thru/or distribute with an emulsifier had the problem of dissociating from an aqueous medium during a preparation process or the preservation after preparing, and transportation.

[0003] In order to solve such oily water separation, the approach by which the conventional proposal is made has many approaches of adding polyhydric alcohol, a surfactant, etc. as a solubilizing agent thru/or a dispersant, and there is some they which is put in practical use. As a typical example of the solubilizing agent proposed thru/or a dispersant, surfactants, such as lecithin, polyoxyethylene sorbitan monooleate (nonionic surfactant), a hydrogenated-castor-oil ethylene oxide addition product, and sucrose fatty acid ester, are mentioned.

[0004] Although lecithin is the natural yolk or the matter of the soybean origin among the conventional solubilizing agent thru/or a dispersant, and it is widely used since safety is also high. When a hydrophilic property is weak, and solubilizes, thru/or distributes the oil solubility matter in an aqueous medium. When a final product was food, there was a problem from a viewpoint of the taste, and since other water-soluble solvents, such as polyhydric alcohol, became still more indispensable, since it was a natural origin component, there was also a fault that stability, such as putrefaction and a rancidity, was missing.

[0005] Moreover, into a chain, since it has the ethylene oxide chain as a hydrophilic radical, an ethylene oxide chain decomposes with time, the solubilization force thru/or dispersion force decline, and also the formalin which is the decomposition product of ethylene oxide is eluted, or a polyoxyethylene system nonionic surfactant has the risk of pH falling, it is not approved by the food-grade way in our country from the problem on safety, but an application has constraint. Moreover, it may decompose under acid conditions and cane-sugar **** ester had the problem that the sufficient solubilization force thru/or dispersion force could not be demonstrated, under the conditions of low pH.

[0006] Furthermore, polyglyceryl fatty acid ester (it may be hereafter called PoGE) is an emulsifier approved as a food additive, and the solubilizing agent thru/or dispersant using this has also been proposed. However, when the solubilizing agent thru/or dispersant using PoGE proposed performed solubilization thru/or distribution for the oil solubility matter to an aqueous

medium, it needed to add other additives, such as polyhydric alcohol, further, and had a taste problem by the additive at the time of using to food, such as using unsaturated fatty acid with low stability with the passage of time as the main configuration fatty acid, etc., and the problem of affecting circulation and preservation of goods.

[0007] With a conventional solubilizing agent thru/or a conventional dispersant, in order to ensure solubilization thru/or distribution for the oil solubility matter at an aquosity medium, there was a problem also in a production process further again — it is necessary in the case of solubilization thru/or distributed actuation to use the emulsifier which gives powerful shearing force to a raw material constituent, a high-pressure homogenizer, etc.. For this reason, the aquosity medium could be made to solubilize thru/or distribute the oil solubility matter by easy actuation, the acquired solubilization system thru/or dispersed system continued at the long period of time, and maintained stability, and, moreover, in the case of the food-grade way, development of the solubilization system thru/or dispersed system which does not affect the taste etc. was desired.

[0008]

[Problem(s) to be Solved by the Invention] This invention aims at solving many following technical problems which existed from the former.

1. Offer the constituent with which it solubilizes thru/or distributes and the oil solubility matter which can be prepared even if it does not use an emulsifier, a high-pressure homogenizer, etc. which give powerful shearing force even if it lessens the class of additive and becomes an aquosity medium.
2. The constituent with which it solubilizes thru/or distributes and the obtained oil solubility matter becomes should continue at a long period of time, and should maintain stability.
3. When the constituent with which the oil solubility matter was solubilized thru/or distributed is a food-grade way, even if what affects the tastes, such as polyhydric alcohol, moreover is not included, offer the constituent which continues at a long period of time and maintains stability.

[0009]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, invention according to claim 1 The oil solubility matter (henceforth B component) with a solubilizing agent thru/or a dispersant (henceforth A component) In the aquosity constituent which is solubilized thru/or distributed and becomes an aquosity medium (henceforth C component) A component 70% of the weight or more of the configuration fatty acid is saturated fatty acid of carbon numbers 12-14. And a cloudy point consists of polyglycerin saturated fatty acid ester which is 20 degrees C or more, and is comparatively characterized by the thing of A component in a constituent, and B component which it comes to blend A component in the range of 1 - 10 weight section to the B component 1 weight section.

[0010] Hereafter, this invention is explained to a detail. The solubilizing agent thru/or dispersant (A component) in this invention makes it indispensable to be used the making an aquosity medium (C component) solubilize thru/or distribute the oil solubility matter (B component) purpose, and for 70% of the weight or more of that configuration fatty acid to consist of saturated fatty acid of carbon numbers 12-14, and for this A component to consist of polyglycerin saturated fatty acid ester whose cloudy point is 20 degrees C or more.

[0011] In addition, *****, solubilization, or distribution means the condition that a system presents a homogeneity phase, in this invention like emulsification distribution conditions, such as a condition that the oil solubility matter (B component) was solubilized by thermodynamic stability in the aquosity medium (C component), a condition of microemulsion, a water-in-oil type, and a water middle oil drop type.

[0012] Hereafter, it explains to a detail per each component.

B component: Although it is oil solubility in itself, B component says the matter which is not water solubility substantially, and it is solubilized thru/or distributed by the aquosity medium and it is used as a final product by A component which carries out a postscript. Although there will be no limit if B component has the above-mentioned property, a coloring agent, flavors, vitamins, an antioxidant, preservatives, antimicrobial agent, or fats and oils is mentioned. As an example of a coloring agent, beta carotene, ANATO coloring matter, curcmae rhizoma coloring matter, etc.

are mentioned. As an example of flavors Orange oil, menthol, etc. are mentioned. As an example of vitamins Vitamin A, vitamin B, vitamin E, etc. are mentioned. As an example of an antioxidant As an example of a mix tocopherol, L-ascorbyl stearate, gamma-orizanol, preservatives, and antimicrobial agent, the animal oil, vegetable oil and fat, etc. of arbitration besides 2-ethylhexanoic acid triglyceride are mentioned as an example of fats and oils, such as a dehydroacetic acid.

[0013] A component: A component achieves the function to make an aqueous medium solubilize thru/or distribute the above-mentioned B component, and consists of polyglycerin saturated fatty acid ester (it is called Following PoGE) which satisfies the above-mentioned requirements. The average degree of polymerization of the polyglycerin (it is called Following PoG) which constitutes this PoGE is four or more, and its thing of 4-12 is usually desirable. Especially, 6-12, and especially the desirable thing of the field of the safety as an additive to average degree of polymerization are 10-12. The mole ratio of the fatty acid at the time of manufacturing PoGE and the hydroxyl group of the PoG origin can be chosen in 1:6-1:100.

[0014] According to the experiment of this invention persons, it turned out to be the need that 70% of the weight or more of the configuration fatty acid of PoGE is saturated fatty acid of carbon numbers 12-14. If flavor may worsen and this has the carbon number of a configuration fatty acid conversely larger than 14 when the carbon number of a configuration fatty acid was less than 12, and the solubilization force thru/or dispersion force decline or it adds for food, such as a drink When it is made to solubilize thru/or distribute under with a pH of three or less acid conditions, it is difficult to form a stable solubilization system thru/or a stable dispersed system, and settlings etc. may arise and neither is desirable. It worsens [flavor] during prolonged preservation and is not desirable if the saturated fatty acid of a configuration fatty acid is less than 70 % of the weight. A carbon number may be mentioned for a lauric acid, a myristic acid, etc. as an example of the saturated fatty acid of 12-14, and these may be independent or you may be mixture.

[0015] Also in the above-mentioned range, the rate of the saturated fatty acid of the carbon numbers 12-14 of the configuration fatty acid of PoGE has 80 desirable % of the weight or more, and 90 % of the weight or more is especially suitable for it. In case the class of configuration fatty acid chooses the raw material which manufactures PoGE, it should just choose what is in the above-mentioned range about the carbon number of a fatty acid, the rate of saturated fatty acid, etc.

[0016] According to the experiment of this invention persons, formation of the stable constituent solubilized thru/or distributed became difficult further for the cloudy point of PoGE in the 10 % of the weight sodium-sulfate water solution of concentration to be less than 20 degrees C, the oil solubility matter dissociated and that settlings etc. arise also found a certain thing. In addition, it asked for the cloudy point of PoGE in this invention by the following cloudy point measuring method. The 10 % of the weight sodium-sulfate water solution of concentration adjusted beforehand was made to mix PoGE so that it may become 1 % of the weight of PoGE concentration, and this mixed liquor was enclosed with the glass tube. It was immersed in the thermostat set as predetermined temperature after heating this glass tube and making mixed liquor into homogeneity, and after leaving it for several minutes thru/or about 1 hour, existence of separation of the liquid in a glass tube was performed by the approach of carrying out visual observation. The temperature up of the temperature of a thermostat was carried out by the fixed temperature unit, the upper actuation was repeated and temperature which an oil solubility component separates for the first time was made into the cloudy point.

[0017] PoGE equipped with the above-mentioned property teaches a reactor, is a 150-300-degree C temperature requirement under an ordinary pressure - number atmospheric pressure, and can manufacture the saturated fatty acid of carbon numbers 12-14, and PoG by making it react under existence of a catalyst. As a catalyst which can be used, alkali, such as a potassium hydroxide and a sodium hydroxide, is mentioned and the amount used can be suitably chosen to 0.001 - 0.025% of the weight in the range to the total amount of a reaction raw material.

[0018] The cloudy point of PoGE can be easily adjusted by choosing the synthetic reaction operating condition. For example, when a cloudy point is in a low temperature side rather than 20

degrees C, since it is in the inclination for the fatty-acid alkali salt (soap) which lessens the number of mols of the fatty acid to PoGE, or the alkali catalyst at the time of PoGE manufacture reacts with a raw material fatty acid, and carries out a byproduction to raise a cloudy point, the amount of alkali catalysts can be made [many], or a cloudy point can be raised by adopting either of the approaches, such as making high the average degree of polymerization of a raw material PoG.

[0019] C component: C component is water and achieves the function as a medium to solubilize thru/or distribute the oil solubility matter (B component). As for water, what used industrial water as the raw material and removed the cation and the anion by the deionization message exchange is desirable.

[0020] Quantum weighing capacity of a solubilizing agent thru/or an above-mentioned dispersant (A component), and above-mentioned B component can be carried out everywhere, under heating, it stirs and mixes and the constituent concerning this invention with which it solubilizes thru/or distributes and the oil solubility matter (B component) becomes an aquosity medium (C component) adds this to an aquosity medium (C component), and the oil solubility matter can be solubilized thru/or distributed, it can cool to a room temperature, and it can prepare it easily. Stirring in this case is not indispensable and shaking stirring extent of applying powerful machine stirring like before is enough as it. However, stirring which applies powerful shearing force is not eliminated at all.

[0021] According to the experiment of this invention persons, although based also on the class of oil solubility matter (B component), a solubilizing agent thru/or a dispersant (A component) can be chosen in the range of 1 – 10 weight section to the B component 1 weight section. In under 1 weight section, since effectiveness does not improve in proportion to it even if it is difficult to make B component solubilize thru/or decentralize, and it increases an addition, when exceeding 10 weight sections, it is not desirable. When pH of a constituent is less than three and it is made to contain more than 1 weight section especially, the purpose of this invention can attain effectively and is desirable. If the rate of A component to the B component 1 weight section is made under into 1 weight section when pH of a constituent is less than three, even if it will perform actuation which solubilizes thru/or distributes the oil solubility matter, since the solubilization system thru/or the dispersed system are unstable The constituent with which it solubilizes thru/or distributes and the oil solubility matter becomes an aquosity medium at stability is not obtained -- the oil solubility matter (B component) dissociates, or settlings arise under acid conditions especially.

[0022] The constituent concerning this invention contains the oil solubility matter (B component) at a rate of arbitration, and the constituent which it is stable under the acid condition of pH 2-5, and neither separation of B component nor precipitate produces by, of course adjusting the amount of A component neutrally and which was solubilized thru/or distributed is obtained. Generally, although the pH values of acid foods are 3.3 or more pH, below this pH of the constituent concerning this invention is stable. Since pH is especially preferably stable also in five or less low pH 10-10000 ppm in it being 100-5000 ppm, the blending ratio of coal of B component in [all] a constituent is desirable.

[0023] The constituent concerning this invention makes it indispensable to mix A component and B component to the aquosity medium which is C component, and also can accept the need further, and can add and blend other components. As other components which can be added and blended, although based also on the application of a constituent They are water-soluble additives, such as a saccharide and polyhydric alcohol, a pH regulator, etc. Specifically Propylene glycol, a glycerol, a sorbitol, xylitol, Arabitol, maltitol, the Lacty toll, sorbitan, a xylose, arabinose, a mannose, a lactose, sugar, coupling sugar, grape sugar, and an enzyme -- saccharification -- a starch syrup, an acid saccharification starch syrup, a maltose starch syrup, a maltose, isomerized sugar, fruit sugar, a reduction maltose starch syrup, a reduction starch sugar starch syrup, honey, etc. are mentioned. Moreover, a citric acid is mentioned as a pH regulator. These may be independent or may be two or more mixture. The addition and loadings of a component besides these in [all] a constituent can be suitably chosen according to the application of a product.

[0024] The constituent concerning this invention has various kinds of applications which present the shape of liquid in ordinary temperature in cosmetics, a deodorant, a bathing agent, an aromatic, a deodorant, food, physic, etc. And the oil solubility matter separates these products, or especially, settlings do not arise under acid conditions, and the oil solubility matter is solubilized thru/or distributed by the aquosity medium at stability.

[0025]

[Effect of the Invention] this invention is as follows -- doing advantageous effectiveness so specially, the utility value on the industry is size very much.

1. The constituent concerning this invention can be prepared easily, without using an emulsifier, a high-pressure homogenizer, etc. which give powerful shearing force, even if it lessens the class of additive, in case an aquosity medium is made to solubilize thru/or distribute the oil solubility matter.
2. The constituent concerning this invention does not deteriorate, while continuing at a long period of time, maintaining stability and being under storage or in a circulation process.
3. The constituent concerning this invention does not spoil taste, such as food, such as a drink, drugs, and cosmetics, a scent, etc.

[0026]

[Example] Next, although this invention is further explained to a detail based on the example of manufacture, and an example, this invention is not limited to the following written examples, unless the summary is exceeded. In addition, in the following examples of manufacture, the raw material which measured the cloudy point of a product by the approach given in the following, and was used in the following examples of manufacture, the example, and the example of a comparison is as follows.

[0027] <the cloudy point measuring method of a product> -- the 10 % of the weight sodium-sulfate water solution of concentration adjusted beforehand was made to mix a resultant so that the concentration of the resultant acquired in the example of manufacture may become 1 % of the weight, and this mixed liquor was enclosed with the glass tube. It was immersed in the thermostat set as predetermined temperature after heating this glass tube and making mixed liquor into homogeneity, and after leaving it for 30 minutes, existence of separation of the liquid in a glass tube was performed by the approach of carrying out visual observation. The temperature up of the temperature of a thermostat was carried out by 5-degree-C unit, the upper actuation was repeated and temperature which an oil solubility component separates for the first time was made into the cloudy point.

<The used sample> [0028]

[Table 1]

ポリグリセリン : ポリグリセリン # 7 5 0 (阪本薬品社製、水酸基価 8 9 0、

平均重合度 1 1)

ラウリン酸 : サンファット # 1 2 (ライオン社製、純度 9 5 % 以上)

ミリスチン酸 : サンファット # 1 2 (ライオン社製、純度 9 5 % 以上)

パルミチン酸 : ルナック P - 9 5 (花王社製、純度 9 5 以上)

ステアリン酸 : ステアリン 7 5 0 (日本油脂社製、ステアリン酸 7 5 重量 %
、パルミチン酸 2 5 重量 %)

[0029] [The example 1 of manufacture] (example of manufacture of PoGE-A - -C)

1200g (PoG) of polyglycerin was first taught to the reaction container with an equipped with an agitator, a thermometer, a heating jacket, gas preparation opening, and raw-material preparation opening capacity of 2l. Subsequently, the lauric acid and 10% sodium-hydroxide water solution were taught to the same reaction container. In addition, the mole ratio of a lauric acid and PoG changed the charge of a lauric acid, as shown in Table -1. The amount of sodium hydroxides was made into 0.0025 % of the weight to the total amount of PoG and a lauric acid.

[0030] After carrying out the temperature up of the internal temperature to 240 degrees C by ordinary pressure and making it react at this temperature for 2.5 hours, the temperature up of the internal temperature was carried out to 260 more degrees C, and it was made to react at

this temperature under a nitrogen air current for 4 hours. An internal temperature is cooled to ordinary temperature after reaction termination, and it is liquefied polyglycerin lauric-acid ester (PoGE). - A - -C was obtained. About the acquired resultant, the cloudy point was measured by the above-mentioned approach. A result is shown in Table -1.

[0031]

[Table 2]

表-1

略 称	脂肪酸/PoG 仕込モル比	曇 点
P o G E - A	0 . 7	9 0℃以上
P o G E - B	1 . 0	7 0℃
P o G E - C	1 . 5	1 0℃

[0032] [The example 2 of manufacture] (example of manufacture of PoGE-D)

1200g of PoG(s) was first taught to the reaction container used in the example 1 of manufacture. Subsequently, the myristic acid (the mole ratio of a myristic acid and PoG was prepared to 1) and 10% sodium-hydroxide water solution (it is 0.0025 % of the weight to the total amount of a reaction raw material about the amount of sodium hydroxides) were taught to the same reaction container.

[0033] It was made to react on the same conditions also in the example 1 of manufacture, and polyglycerin myristic-acid ester was obtained. The acetone insoluble matter which distributed and heated, carried out the decantation to the acetone of the amount of about 5 times, separated into the insoluble section and a fusible part, carried out reduced pressure drying of this thing, and obtained it is called PoGE-D. When the cloudy point was measured about this insoluble matter, it was 90 degrees C or more.

[0034] [The example 3 of manufacture] (PoGE-E, example of manufacture of PoGE-F)

1200g of PoG(s) was first taught to the reaction container used in the example 1 of manufacture. Subsequently, a palmitic acid or stearin acid (the mole ratio of a palmitic acid, stearin acid, and PoG was taken as the passage of Table -2.), and 10% sodium-hydroxide water solution (same as the above) were taught to the same reaction container.

[0035] It was made to react on the same conditions also in the example 1 of manufacture, and a polyglycerin palmitic acid (henceforth PoGE-E) or stearic acid ester (henceforth PoGE-F) was obtained. About the acquired resultant, the cloudy point was measured by the above-mentioned approach. A result is shown in Table -2.

[0036]

[Table 3]

表-2

略 称	脂肪酸の種類	脂肪酸/PoG 仕込モル比	曇 点
P o G E - E	パルミチン酸	0 . 7	3 0℃以上
P o G E - F	ステアリン酸	1 . 0	3 0℃以上

[0037] D as [example 1] oil solubility matter, and L-alpha-tocopherol (vitamin E) [Tokyo -- Formation -- make -- weighing capacity of the best]25 weight section and the PoGE-A75 weight section manufactured in the example 1 of manufacture is carried out (B component / A component = 1/3) -- it mixed and stirred at 60-70 degrees C, and mixture was obtained. In 0.2g of this mixture, the constituent to which the oil solubility matter solubilized thru/or distributed it to homogeneity by the citric acid when pH was mixed and stirred at 100ml of water with a temperature of 25 degrees C set to 3 was obtained. Even if it put this constituent for one month at 25 degrees C and put for one month at 5 more degrees C, neither oily water separation nor precipitation was produced.

[0038] Weighing capacity of the [example 2] vitamin-E (as of the same kind as example 1) 15 weight section and the PoGE-A85 weight section was carried out (B component / A component = 1/5.7), it mixed and stirred at 60-70 degrees C, and mixture was obtained. When this mixture was mixed and stirred at 0.07g, 0.13g, and 100ml of water with a temperature of 25 degrees C to which weighing capacity of the 1.33g was carried out, respectively, and all set 0.67g of 0.33g of pH to 3 by the citric acid, the constituent which was solubilized thru/or distributed to homogeneity in any case was obtained. Even if it put this constituent for one month at 25 degrees C and put for one month at 5 more degrees C, neither oily water separation nor precipitation was produced.

[0039] Weighing capacity of the [example 3] vitamin-E (as of the same kind as example 1) 20 weight section and the PoGE-B80 weight section was carried out (B component / A component = 1/4), it mixed and stirred at 60-70 degrees C, and mixture was obtained. When 0.25g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 3, the uniform constituent solubilized thru/or distributed was obtained. Even if it put this constituent for one month at 25 degrees C and put for one month at 5 more degrees C, neither oily water separation nor precipitation was produced.

[0040] Weighing capacity of the [example 4] vitamin-E (as of the same kind as example 1) 20 weight section and the PoGE-D80 weight section was carried out (B component / A component = 1/4), stirring mixing was carried out at 60-70 degrees C, and mixture was obtained. When 0.25g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 3, the uniform constituent solubilized thru/or distributed was obtained. Even if it put this constituent for one month at 25 degrees C and put for one month at 5 more degrees C, neither oily water separation nor precipitation was produced.

[0041] Weighing capacity of the Orange oil [product made from Consonance Perfume] 15 weight section as [example 5] oil solubility matter and the PoGE-A85 weight section was carried out (B component / A component = 1/5.7), it mixed and stirred at 60-70 degrees C, and mixture was obtained. When 0.33g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 3, the uniform constituent solubilized thru/or distributed was obtained. Even if it put this constituent for one month at 25 degrees C, neither oily water separation nor precipitation was produced.

[0042] Weighing capacity of the 2-ethylhexanoic acid triglyceride [10 by the Nisshin Oil Mills, Ltd.] weight section as [example 6] oil solubility matter and the PoGE-A90 weight section was carried out (B component / A component = 1/9), stirring mixing was carried out at 60-70 degrees C, and mixture was obtained. When 0.50g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 3, the uniform constituent solubilized thru/or distributed was obtained. Even if it put this constituent for one month at 25 degrees C and put for one month at 5 more degrees C, neither oily water separation nor precipitation was produced.

[0043] Weighing capacity of the [example 7] 2-ethylhexanoic acid triglyceride (as of the same kind as example 6) 10 weight section and the PoGE-B90 weight section was carried out (B component / A component = 1/9), it mixed and stirred at 60-70 degrees C, and mixture was obtained. When 0.50g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 3, the uniform constituent solubilized thru/or distributed was obtained. Even if it put this constituent for one month at 25 degrees C, neither oily water separation nor precipitation was produced.

[0044] Weighing capacity of the [example 8] vitamin-E (as of the same kind as example 1) 10 weight section and the PoGE-A60 weight section was carried out (B component / A component = 1/6), the best glycerol [the product made from KISHIDA Chemistry] was further mixed and stirred at 30 weight ***** and 60-70 degrees C, and mixture was obtained. When 0.50g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 3, the uniform constituent solubilized thru/or distributed was obtained. Even if it put this constituent for one month at 25 degrees C and put for one month at 5 more degrees C, neither oily water separation nor precipitation was produced.

[0045] Weighing capacity of the vitamin A palmitate [Riken Vitamin Co., Ltd.] 7 weight section as

[example 9] oil solubility matter and the PoGE-B63 weight section was carried out (B component / A component = 1/9), the best glycerol (as of the same kind as an example 8) was further mixed and stirred at 30 weight ***** and 60-70 degrees C, and mixture was obtained. When 0.14g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 3, the uniform constituent solubilized thru/or distributed was obtained. Even if it put this constituent for one month at 25 degrees C, neither oily water separation nor precipitation was produced.

[0046] Weighing capacity of the [example 10] vitamin-E (as of the same kind as example 1) 40 weight section and the PoGE-B80 weight section was carried out (B component / A component = 1/2), it mixed and stirred at 60-70 degrees C, and mixture was obtained. When 0.15g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 4, the uniform constituent solubilized thru/or distributed was obtained. Even if it put this constituent for one month at 25 degrees C and put for one month at 5 more degrees C, neither oily water separation nor precipitation was produced.

[0047] Weighing capacity of the [example 11] 2-ethylhexanoic acid triglyceride (as of the same kind as example 6) 30 weight section and the PoGE-B45 weight section was carried out (B component / A component = 1/1.5), it mixed and stirred at 60-70 degrees C, and mixture was obtained. When 0.13g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 5, the uniform constituent solubilized thru/or distributed was obtained. Even if it put this constituent for one month at 25 degrees C and put for one month at 5 more degrees C, neither oily water separation nor precipitation was produced.

[0048] Weighing capacity of the [example 1 of comparison] vitamin-E (as of the same kind as example 1) 10 weight section and the PoGE-C(cloudy point of this thing is 10 degrees C) 90 weight section was carried out (B component / A component = 1/9), it mixed and stirred at 60-70 degrees C, and mixture was obtained. When 0.5g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 3, precipitation was produced and the uniform constituent solubilized thru/or distributed was not obtained.

[0049] Weighing capacity of the [example 2 of comparison] vitamin-E (as of the same kind as example 1) 15 weight section and the PoGE-E(fatty acid of this thing is palmitic acid) 85 weight section was carried out (B component / A component = 1/5.7), it mixed and stirred at 60-70 degrees C, and mixture was obtained. When 0.33g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 3, precipitation was produced and the uniform constituent solubilized thru/or distributed was not obtained.

[0050] Weighing capacity of the [example 3 of comparison] vitamin-E (as of the same kind as example 1) 20 weight section and the PoGE-F(fatty acid of this thing is stearin acid) 80 weight section was carried out (B component / A component = 1/4), it mixed and stirred at 60-70 degrees C, and mixture was obtained. When 0.25g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 3, precipitation was produced and the uniform constituent solubilized thru/or distributed was not obtained.

[0051]

[Table 4]

表 - 3

項目 番号	PoGE の種類	B成分 / A成分 (重量比)	添 加 物	組成物の状態
実施例 1	PoGE-A	1 / 3	—	可溶化ないし分散
" 2	PoGE-A	1 / 5.7	—	"
" 3	PoGE-B	1 / 4	—	"
" 4	PoGE-D	1 / 4	—	"
" 5	PoGE-A	1 / 5.7	—	"
" 6	PoGE-A	1 / 9	—	"
" 7	PoGE-B	1 / 9	—	"
" 8	PoGE-B	1 / 6	グリセリン	"
" 9	PoGE-B	1 / 9	グリセリン	"
" 10	PoGE-B	1 / 2	—	"
" 11	PoGE-B	1 / 1.5	—	"
比較例 1	PoGE-C	1 / 9	—	沈殿が生成
" 2	PoGE-E	1 / 5.7	—	"
" 3	PoGE-F	1 / 4	—	"

[0052] The following thing is clearer than an example 1 – an example 11, the example 1 of a comparison – the example 3 of a comparison.

(1) Even if the constituent with which the oil solubility matter concerning this invention was solubilized thru/or distributed forms soluble [uniform] thru/or a uniform dispersed system and it puts this system for a long period of time, oily water separation and precipitation generate and are stable (example 1 – example 11 reference).

(2) On the other hand, when the cloudy point of PoGE does not satisfy the requirements for claim 1, precipitate arises in a constituent and soluble [uniform] thru/or a uniform dispersed system is not formed again (example of comparison 1 reference).

(3) When the fatty acid which constitutes PoGE furthermore does not satisfy the requirements for claim 1, precipitate arises in a constituent and soluble [uniform] thru/or a uniform dispersed system is not formed (example 2 of comparison – example of comparison 3 reference).

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TECHNICAL FIELD

[Industrial Application] This invention relates to the constituent which makes an aqueous medium solubilize thru/or come to distribute the oil solubility matter. It is related with the constituent with which it solubilizes thru/or distributes and oil solubility matter, such as a coloring agent, flavors, vitamins, an antioxidant, preservatives, antimicrobial agent, or fats and oils, becomes an aqueous medium in more detail.

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PRIOR ART

[Description of the Prior Art] Various kinds of goods which present the shape of liquid in ordinary temperature are making the aqueous medium solubilize thru/or distribute oil solubility matter, such as a coloring agent, flavors, vitamins, an antioxidant, preservatives, antimicrobial agent, or fats and oils, with an emulsifier in cosmetics, a deodorant, a bathing agent, an aromatic, a deodorant, food, physic, etc. conventionally. However, the oil solubility matter which the aqueous medium was made to solubilize thru/or distribute with an emulsifier had the problem of dissociating from an aqueous medium during a preparation process or the preservation after preparing, and transportation.

[0003] In order to solve such oily water separation, the approach by which the conventional proposal is made has many approaches of adding polyhydric alcohol, a surfactant, etc. as a solubilizing agent thru/or a dispersant, and there is some they which is put in practical use. As a typical example of the solubilizing agent proposed thru/or a dispersant, surfactants, such as lecithin, polyoxyethylene sorbitan monooleate (nonionic surfactant), a hydrogenated-castor-oil ethylene oxide addition product, and sucrose fatty acid ester, are mentioned.

[0004] Although lecithin is the natural yolk or the matter of the soybean origin among the conventional solubilizing agent thru/or a dispersant, and it is widely used since safety is also high. When a hydrophilic property is weak, and solubilizes, thru/or distributes the oil solubility matter in an aqueous medium. When a final product was food, there was a problem from a viewpoint of the taste, and since other water-soluble solvents, such as polyhydric alcohol, became still more indispensable, since it was a natural origin component, there was also a fault that stability, such as putrefaction and a rancidity, was missing.

[0005] Moreover, into a chain, since it has the ethylene oxide chain as a hydrophilic radical, an ethylene oxide chain decomposes with time, the solubilization force thru/or dispersion force decline, and also the formalin which is the decomposition product of ethylene oxide is eluted, or a polyoxyethylene system nonionic surfactant has the risk of pH falling, it is not approved by the food-grade way in our country from the problem on safety, but an application has constraint. Moreover, it may decompose under acid conditions and cane-sugar **** ester had the problem that the sufficient solubilization force thru/or dispersion force could not be demonstrated, under the conditions of low pH.

[0006] Furthermore, polyglyceryl fatty acid ester (it may be hereafter called PoGE) is an emulsifier approved as a food additive, and the solubilizing agent thru/or dispersant using this has also been proposed. However, when the solubilizing agent thru/or dispersant using PoGE proposed performed solubilization thru/or distribution for the oil solubility matter to an aqueous medium, it needed to add other additives, such as polyhydric alcohol, further, and had a taste problem by the additive at the time of using to food, such as using unsaturated fatty acid with low stability with the passage of time as the main configuration fatty acid, etc., and the problem of affecting circulation and preservation of goods.

[0007] With a conventional solubilizing agent thru/or a conventional dispersant, in order to ensure solubilization thru/or distribution for the oil solubility matter at an aqueous medium, there was a problem also in a production process further again -- it is necessary in the case of solubilization thru/or distributed actuation to use the emulsifier which gives powerful shearing

force to a raw material constituent, a high-pressure homogenizer, etc.. For this reason, the aquosity medium could be made to solubilize thru/or distribute the oil solubility matter by easy actuation, the acquired solubilization system thru/or dispersed system continued at the long period of time, and maintained stability, and, moreover, in the case of the food-grade way, development of the solubilization system thru/or dispersed system which does not affect the taste etc. was desired.

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EFFECT OF THE INVENTION

[Effect of the Invention] this invention is as follows -- doing advantageous effectiveness so specially, the utility value on the industry is size very much.

1. The constituent concerning this invention can be prepared easily, without using an emulsifier, a high-pressure homogenizer, etc. which give powerful shearing force, even if it lessens the class of additive, in case an aqueous medium is made to solubilize thru/or distribute the oil solubility matter.
2. The constituent concerning this invention does not deteriorate, while continuing at a long period of time, maintaining stability and being under storage or in a circulation process.
3. The constituent concerning this invention does not spoil taste, such as food, such as a drink, drugs, and cosmetics, a scent, etc.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] This invention aims at solving many following technical problems which existed from the former.

1. Offer the constituent with which it solubilizes thru/or distributes and the oil solubility matter which can be prepared even if it does not use an emulsifier, a high-pressure homogenizer, etc. which give powerful shearing force even if it lessens the class of additive and becomes an aqueous medium.
2. The constituent with which it solubilizes thru/or distributes and the obtained oil solubility matter becomes should continue at a long period of time, and should maintain stability.
3. When the constituent with which the oil solubility matter was solubilized thru/or distributed is a food-grade way, even if what affects the tastes, such as polyhydric alcohol, moreover is not included, offer the constituent which continues at a long period of time and maintains stability.

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MEANS

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, invention according to claim 1 The oil solubility matter (henceforth B component) with a solubilizing agent thru/or a dispersant (henceforth A component) In the aqueous constituent which is solubilized thru/or distributed and becomes an aqueous medium (henceforth C component) A component 70% of the weight or more of the configuration fatty acid is saturated fatty acid of carbon numbers 12-14. And a cloudy point consists of polyglycerin saturated fatty acid ester which is 20 degrees C or more, and is comparatively characterized by the thing of A component in a constituent, and B component which it comes to blend A component in the range of 1 - 10 weight section to the B component 1 weight section.

[0010] Hereafter, this invention is explained to a detail. The solubilizing agent thru/or dispersant (A component) in this invention makes it indispensable to be used the making an aqueous medium (C component) solubilize thru/or distribute the oil solubility matter (B component) purpose, and for 70% of the weight or more of that configuration fatty acid to consist of saturated fatty acid of carbon numbers 12-14, and for this A component to consist of polyglycerin saturated fatty acid ester whose cloudy point is 20 degrees C or more.

[0011] In addition, *****, solubilization, or distribution means the condition that a system presents a homogeneity phase, in this invention like emulsification distribution conditions, such as a condition that the oil solubility matter (B component) was solubilized by thermodynamic stability in the aqueous medium (C component), a condition of microemulsion, a water-in-oil type, and a water middle oil drop type.

[0012] Hereafter, it explains to a detail per each component.

B component: Although it is oil solubility in itself, B component says the matter which is not water solubility substantially, and it is solubilized thru/or distributed by the aqueous medium and it is used as a final product by A component which carries out a postscript. Although there will be no limit if B component has the above-mentioned property, a coloring agent, flavors, vitamins, an antioxidant, preservatives, antimicrobial agent, or fats and oils is mentioned. As an example of a coloring agent, beta carotene, ANATO coloring matter, curcmae rhizoma coloring matter, etc. are mentioned. As an example of flavors Orange oil, menthol, etc. are mentioned. As an example of vitamins Vitamin A, vitamin B, vitamin E, etc. are mentioned. As an example of an antioxidant As an example of a mix tocopherol, L-ascorbyl stearate, gamma-orizanol, preservatives, and antimicrobial agent, the animal oil, vegetable oil and fat, etc. of arbitration besides 2-ethylhexanoic acid triglyceride are mentioned as an example of fats and oils, such as a dehydroacetic acid.

[0013] A component: A component achieves the function to make an aqueous medium solubilize thru/or distribute the above-mentioned B component, and consists of polyglycerin saturated fatty acid ester (it is called Following PoGE) which satisfies the above-mentioned requirements. The average degree of polymerization of the polyglycerin (it is called Following PoG) which constitutes this PoGE is four or more, and its thing of 4-12 is usually desirable. Especially, 6-12, and especially the desirable thing of the field of the safety as an additive to average degree of polymerization are 10-12. The mole ratio of the fatty acid at the time of manufacturing PoGE and the hydroxyl group of the PoG origin can be chosen in 1:6-1:100.

[0014] According to the experiment of this invention persons, it turned out to be the need that 70% of the weight or more of the configuration fatty acid of PoGE is saturated fatty acid of carbon numbers 12-14. If flavor may worsen and this has the carbon number of a configuration fatty acid conversely larger than 14 when the carbon number of a configuration fatty acid was less than 12, and the solubilization force thru/or dispersion force decline or it adds for food, such as a drink When it is made to solubilize thru/or distribute under with a pH of three or less acid conditions, it is difficult to form a stable solubilization system thru/or a stable dispersed system, and settlings etc. may arise and neither is desirable. It worsens [flavor] during prolonged preservation and is not desirable if the saturated fatty acid of a configuration fatty acid is less than 70 % of the weight. A carbon number may be mentioned for a lauric acid, a myristic acid, etc. as an example of the saturated fatty acid of 12-14, and these may be independent or you may be mixture.

[0015] Also in the above-mentioned range, the rate of the saturated fatty acid of the carbon numbers 12-14 of the configuration fatty acid of PoGE has 80 desirable % of the weight or more, and 90 % of the weight or more is especially suitable for it. In case the class of configuration fatty acid chooses the raw material which manufactures PoGE, it should just choose what is in the above-mentioned range about the carbon number of a fatty acid, the rate of saturated fatty acid, etc.

[0016] According to the experiment of this invention persons, formation of the stable constituent solubilized thru/or distributed became difficult further for the cloudy point of PoGE in the 10 % of the weight sodium-sulfate water solution of concentration to be less than 20 degrees C, the oil solubility matter dissociated and that settlings etc. arise also found a certain thing. In addition, it asked for the cloudy point of PoGE in this invention by the following cloudy point measuring method. The 10 % of the weight sodium-sulfate water solution of concentration adjusted beforehand was made to mix PoGE so that it may become 1 % of the weight of PoGE concentration, and this mixed liquor was enclosed with the glass tube. It was immersed in the thermostat set as predetermined temperature after heating this glass tube and making mixed liquor into homogeneity, and after leaving it for several minutes thru/or about 1 hour, existence of separation of the liquid in a glass tube was performed by the approach of carrying out visual observation. The temperature up of the temperature of a thermostat was carried out by the fixed temperature unit, the upper actuation was repeated and temperature which an oil solubility component separates for the first time was made into the cloudy point.

[0017] PoGE equipped with the above-mentioned property teaches a reactor, is a 150-300-degree C temperature requirement under an ordinary pressure - number atmospheric pressure, and can manufacture the saturated fatty acid of carbon numbers 12-14, and PoG by making it react under existence of a catalyst. As a catalyst which can be used, alkali, such as a potassium hydroxide and a sodium hydroxide, is mentioned and the amount used can be suitably chosen to 0.001 - 0.025% of the weight in the range to the total amount of a reaction raw material.

[0018] The cloudy point of PoGE can be easily adjusted by choosing the synthetic reaction operating condition. For example, when a cloudy point is in a low temperature side rather than 20 degrees C, since it is in the inclination for the fatty-acid alkali salt (soap) which lessens the number of mols of the fatty acid to PoGE, or the alkali catalyst at the time of PoGE manufacture reacts with a raw material fatty acid, and carries out a byproduction to raise a cloudy point, the amount of alkali catalysts can be made [many], or a cloudy point can be raised by adopting either of the approaches, such as making high the average degree of polymerization of a raw material PoG.

[0019] C component: C component is water and achieves the function as a medium to solubilize thru/or distribute the oil solubility matter (B component). As for water, what used industrial water as the raw material and removed the cation and the anion by the deionization message exchange is desirable.

[0020] Quantum weighing capacity of a solubilizing agent thru/or an above-mentioned dispersant (A component), and above-mentioned B component can be carried out everywhere, under heating, it stirs and mixes and the constituent concerning this invention with which it solubilizes thru/or distributes and the oil solubility matter (B component) becomes an aquosity medium (C

component) adds this to an aqueous medium (C component), and the oil solubility matter can be solubilized thru/or distributed, it can cool to a room temperature, and it can prepare it easily. Stirring in this case is not indispensable and shaking stirring extent of applying powerful machine stirring like before is enough as it. However, stirring which applies powerful shearing force is not eliminated at all.

[0021] According to the experiment of this invention persons, although based also on the class of oil solubility matter (B component), a solubilizing agent thru/or a dispersant (A component) can be chosen in the range of 1 – 10 weight section to the B component 1 weight section. In under 1 weight section, since effectiveness does not improve in proportion to it even if it is difficult to make B component solubilize thru/or decentralize, and it increases an addition, when exceeding 10 weight sections, it is not desirable. When pH of a constituent is less than three and it is made to contain more than 1 weight section especially, the purpose of this invention can attain effectively and is desirable. If the rate of A component to the B component 1 weight section is made under into 1 weight section when pH of a constituent is less than three, even if it will perform actuation which solubilizes thru/or distributes the oil solubility matter, since the solubilization system thru/or the dispersed system are unstable The constituent with which it solubilizes thru/or distributes and the oil solubility matter becomes an aqueous medium at stability is not obtained -- the oil solubility matter (B component) dissociates, or settlings arise under acid conditions especially.

[0022] The constituent concerning this invention contains the oil solubility matter (B component) at a rate of arbitration, and the constituent which it is stable under the acid condition of pH 2-5, and neither separation of B component nor precipitate produces by, of course adjusting the amount of A component neutrally and which was solubilized thru/or distributed is obtained. Generally, although the pH values of acid foods are 3.3 or more pH, below this pH of the constituent concerning this invention is stable. Since pH is especially preferably stable also in five or less low pH 10-10000 ppm in it being 100-5000 ppm, the blending ratio of coal of B component in [all] a constituent is desirable.

[0023] The constituent concerning this invention makes it indispensable to mix A component and B component to the aqueous medium which is C component, and also can accept the need further, and can add and blend other components. As other components which can be added and blended, although based also on the application of a constituent They are water-soluble additives, such as a saccharide and polyhydric alcohol, a pH regulator, etc. Specifically Propylene glycol, a glycerol, a sorbitol, xylitol, Arabitol, maltitol, the Lacty toll, sorbitan, a xylose, arabinose, a mannose, a lactose, sugar, coupling sugar, grape sugar, and an enzyme -- saccharification -- a starch syrup, an acid saccharification starch syrup, a maltose starch syrup, a maltose, isomerized sugar, fruit sugar, a reduction maltose starch syrup, a reduction starch sugar starch syrup, honey, etc. are mentioned. Moreover, a citric acid is mentioned as a pH regulator. These may be independent or may be two or more mixture. The addition and loadings of a component besides these in [all] a constituent can be suitably chosen according to the application of a product.

[0024] The constituent concerning this invention has various kinds of applications which present the shape of liquid in ordinary temperature in cosmetics, a deodorant, a bathing agent, an aromatic, a deodorant, food, physic, etc. And the oil solubility matter separates these products, or especially, settlings do not arise under acid conditions, and the oil solubility matter is solubilized thru/or distributed by the aqueous medium at stability.

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EXAMPLE

[Example] Next, although this invention is further explained to a detail based on the example of manufacture, and an example, this invention is not limited to the following written examples, unless the summary is exceeded. In addition, in the following examples of manufacture, the raw material which measured the cloudy point of a product by the approach given in the following, and was used in the following examples of manufacture, the example, and the example of a comparison is as follows.

[0027] <the cloudy point measuring method of a product> -- the 10 % of the weight sodium-sulfate water solution of concentration adjusted beforehand was made to mix a resultant so that the concentration of the resultant acquired in the example of manufacture may become 1 % of the weight, and this mixed liquor was enclosed with the glass tube. It was immersed in the thermostat set as predetermined temperature after heating this glass tube and making mixed liquor into homogeneity, and after leaving it for 30 minutes, existence of separation of the liquid in a glass tube was performed by the approach of carrying out visual observation. The temperature up of the temperature of a thermostat was carried out by 5-degree-C unit, the upper actuation was repeated and temperature which an oil solubility component separates for the first time was made into the cloudy point.

<The used sample> [0028]

[Table 1]

ポリグリセリン : ポリグリセリン # 7 5 0 (阪本薬品社製、水酸基価 8 9 0 、
平均重合度 1 1)
ラウリン酸 : サンファット # 1 2 (ライオン社製、純度 9 5 % 以上)
ミリスチン酸 : サンファット # 1 2 (ライオン社製、純度 9 5 % 以上)
パルミチン酸 : ルナック P - 9 5 (花王社製、純度 9 5 以上)
ステアリン酸 : ステアリン 7 5 0 (日本油脂社製、ステアリン酸 7 5 重量 %
、パルミチン酸 2 5 重量 %)

[0029] [The example 1 of manufacture] (example of manufacture of PoGE-A - -C)

1200g (PoG) of polyglycerin was first taught to the reaction container with an equipped with an agitator, a thermometer, a heating jacket, gas preparation opening, and raw-material preparation opening capacity of 2l. Subsequently, the lauric acid and 10% sodium-hydroxide water solution were taught to the same reaction container. In addition, the mole ratio of a lauric acid and PoG changed the charge of a lauric acid, as shown in Table -1. The amount of sodium hydroxides was made into 0.0025 % of the weight to the total amount of PoG and a lauric acid.

[0030] After carrying out the temperature up of the internal temperature to 240 degrees C by ordinary pressure and making it react at this temperature for 2.5 hours, the temperature up of the internal temperature was carried out to 260 more degrees C, and it was made to react at this temperature under a nitrogen air current for 4 hours. An internal temperature is cooled to ordinary temperature after reaction termination, and it is liquefied polyglycerin lauric-acid ester (PoGE). - A - -C was obtained. About the acquired resultant, the cloudy point was measured by the above-mentioned approach. A result is shown in Table -1.

[0031]

[Table 2]

表-1

略 称	ラウリン酸/PoG 仕込モル比	曇 点
P o G E - A	0 . 7	9 0℃以上
P o G E - B	1 . 0	7 0℃
P o G E - C	1 . 5	1 0℃

[0032] [The example 2 of manufacture] (example of manufacture of PoGE-D)

1200g of PoG(s) was first taught to the reaction container used in the example 1 of manufacture. Subsequently, the myristic acid (the mole ratio of a myristic acid and PoG was prepared to 1) and 10% sodium-hydroxide water solution (it is 0.0025 % of the weight to the total amount of a reaction raw material about the amount of sodium hydroxides) were taught to the same reaction container.

[0033] It was made to react on the same conditions also in the example 1 of manufacture, and polyglycerin myristic-acid ester was obtained. The acetone insoluble matter which distributed and heated, carried out the decantation to the acetone of the amount of about 5 times, separated into the insoluble section and a fusible part, carried out reduced pressure drying of this thing, and obtained it is called PoGE-D. When the cloudy point was measured about this insoluble matter, it was 90 degrees C or more.

[0034] [The example 3 of manufacture] (PoGE-E, example of manufacture of PoGE-F)

1200g of PoG(s) was first taught to the reaction container used in the example 1 of manufacture. Subsequently, a palmitic acid or stearin acid (the mole ratio of a palmitic acid, stearin acid, and PoG was taken as the passage of Table -2.), and 10% sodium-hydroxide water solution (same as the above) were taught to the same reaction container.

[0035] It was made to react on the same conditions also in the example 1 of manufacture, and a polyglycerin palmitic acid (henceforth PoGE-E) or stearic acid ester (henceforth PoGE-F) was obtained. About the acquired resultant, the cloudy point was measured by the above-mentioned approach. A result is shown in Table -2.

[0036]

[Table 3]

表-2

略 称	脂肪酸の種類	脂肪酸/P o G 仕込モル比	曇 点
P o G E - E	パルミチン酸	0 . 7	3 0℃以上
P o G E - F	ステアリン酸	1 . 0	3 0℃以上

[0037] D as [example 1] oil solubility matter, and L-alpha-tocopherol (vitamin E) [Tokyo -- Formation -- make -- weighing capacity of the best] 25 weight section and the PoGE-A75 weight section manufactured in the example 1 of manufacture is carried out (B component / A component = 1/3) -- it mixed and stirred at 60-70 degrees C, and mixture was obtained. In 0.2g of this mixture, the constituent to which the oil solubility matter solubilized thru/or distributed it to homogeneity by the citric acid when pH was mixed and stirred at 100ml of water with a temperature of 25 degrees C set to 3 was obtained. Even if it put this constituent for one month at 25 degrees C and put for one month at 5 more degrees C, neither oily water separation nor precipitation was produced.

[0038] Weighing capacity of the [example 2] vitamin-E (as of the same kind as example 1) 15 weight section and the PoGE-A85 weight section was carried out (B component / A component = 1/5.7), it mixed and stirred at 60-70 degrees C, and mixture was obtained. When this mixture was mixed and stirred at 0.07g, 0.13g, and 100ml of water with a temperature of 25 degrees C to

which weighing capacity of the 1.33g was carried out, respectively, and all set 0.67g of 0.33g of pH to 3 by the citric acid, the constituent which was solubilized thru/or distributed to homogeneity in any case was obtained. Even if it put this constituent for one month at 25 degrees C and put for one month at 5 more degrees C, neither oily water separation nor precipitation was produced.

[0039] Weighing capacity of the [example 3] vitamin-E (as of the same kind as example 1) 20 weight section and the PoGE-B80 weight section was carried out (B component / A component = 1/4), it mixed and stirred at 60-70 degrees C, and mixture was obtained. When 0.25g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 3, the uniform constituent solubilized thru/or distributed was obtained. Even if it put this constituent for one month at 25 degrees C and put for one month at 5 more degrees C, neither oily water separation nor precipitation was produced.

[0040] Weighing capacity of the [example 4] vitamin-E (as of the same kind as example 1) 20 weight section and the PoGE-D80 weight section was carried out (B component / A component = 1/4), stirring mixing was carried out at 60-70 degrees C, and mixture was obtained. When 0.25g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 3, the uniform constituent solubilized thru/or distributed was obtained. Even if it put this constituent for one month at 25 degrees C and put for one month at 5 more degrees C, neither oily water separation nor precipitation was produced.

[0041] Weighing capacity of the Orange oil [product made from Consonance Perfume] 15 weight section as [example 5] oil solubility matter and the PoGE-A85 weight section was carried out (B component / A component = 1/5.7), it mixed and stirred at 60-70 degrees C, and mixture was obtained. When 0.33g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 3, the uniform constituent solubilized thru/or distributed was obtained. Even if it put this constituent for one month at 25 degrees C, neither oily water separation nor precipitation was produced.

[0042] Weighing capacity of the 2-ethylhexanoic acid triglyceride [10 by the Nisshin Oil Mills, Ltd.] weight section as [example 6] oil solubility matter and the PoGE-A90 weight section was carried out (B component / A component = 1/9), stirring mixing was carried out at 60-70 degrees C, and mixture was obtained. When 0.50g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 3, the uniform constituent solubilized thru/or distributed was obtained. Even if it put this constituent for one month at 25 degrees C and put for one month at 5 more degrees C, neither oily water separation nor precipitation was produced.

[0043] Weighing capacity of the [example 7] 2-ethylhexanoic acid triglyceride (as of the same kind as example 6) 10 weight section and the PoGE-B90 weight section was carried out (B component / A component = 1/9), it mixed and stirred at 60-70 degrees C, and mixture was obtained. When 0.50g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 3, the uniform constituent solubilized thru/or distributed was obtained. Even if it put this constituent for one month at 25 degrees C, neither oily water separation nor precipitation was produced.

[0044] Weighing capacity of the [example 8] vitamin-E (as of the same kind as example 1) 10 weight section and the PoGE-A60 weight section was carried out (B component / A component = 1/6), the best glycerol [the product made from KISHIDA Chemistry] was further mixed and stirred at 30 weight ***** and 60-70 degrees C, and mixture was obtained. When 0.50g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 3, the uniform constituent solubilized thru/or distributed was obtained. Even if it put this constituent for one month at 25 degrees C and put for one month at 5 more degrees C, neither oily water separation nor precipitation was produced.

[0045] Weighing capacity of the vitamin A palmitate [Riken Vitamin Co., Ltd.] 7 weight section as [example 9] oil solubility matter and the PoGE-B63 weight section was carried out (B component / A component = 1/9), the best glycerol (as of the same kind as an example 8) was further mixed and stirred at 30 weight ***** and 60-70 degrees C, and mixture was obtained. When 0.14g of this mixture was mixed and stirred by the citric acid at 100ml of water with a

temperature of 25 degrees C which set pH to 3, the uniform constituent solubilized thru/or distributed was obtained. Even if it put this constituent for one month at 25 degrees C, neither oily water separation nor precipitation was produced.

[0046] Weighing capacity of the [example 10] vitamin-E (as of the same kind as example 1) 40 weight section and the PoGE-B80 weight section was carried out (B component / A component = 1/2), it mixed and stirred at 60-70 degrees C, and mixture was obtained. When 0.15g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 4, the uniform constituent solubilized thru/or distributed was obtained. Even if it put this constituent for one month at 25 degrees C and put for one month at 5 more degrees C, neither oily water separation nor precipitation was produced.

[0047] Weighing capacity of the [example 11] 2-ethylhexanoic acid triglyceride (as of the same kind as example 6) 30 weight section and the PoGE-B45 weight section was carried out (B component / A component = 1/1.5), it mixed and stirred at 60-70 degrees C, and mixture was obtained. When 0.13g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 5, the uniform constituent solubilized thru/or distributed was obtained. Even if it put this constituent for one month at 25 degrees C and put for one month at 5 more degrees C, neither oily water separation nor precipitation was produced.

[0048] Weighing capacity of the [example 1 of comparison] vitamin-E (as of the same kind as example 1) 10 weight section and the PoGE-C (cloudy point of this thing is 10 degrees C) 90 weight section was carried out (B component / A component = 1/9), it mixed and stirred at 60-70 degrees C, and mixture was obtained. When 0.5g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 3, precipitation was produced and the uniform constituent solubilized thru/or distributed was not obtained.

[0049] Weighing capacity of the [example 2 of comparison] vitamin-E (as of the same kind as example 1) 15 weight section and the PoGE-E (fatty acid of this thing is palmitic acid) 85 weight section was carried out (B component / A component = 1/5.7), it mixed and stirred at 60-70 degrees C, and mixture was obtained. When 0.33g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 3, precipitation was produced and the uniform constituent solubilized thru/or distributed was not obtained.

[0050] Weighing capacity of the [example 3 of comparison] vitamin-E (as of the same kind as example 1) 20 weight section and the PoGE-F (fatty acid of this thing is stearin acid) 80 weight section was carried out (B component / A component = 1/4), it mixed and stirred at 60-70 degrees C, and mixture was obtained. When 0.25g of this mixture was mixed and stirred by the citric acid at 100ml of water with a temperature of 25 degrees C which set pH to 3, precipitation was produced and the uniform constituent solubilized thru/or distributed was not obtained.

[0051]

[Table 4]

表 - 3

項目 番号	PoGE の種類	B成分 / A成 分 (重量比)	添 加 物	組成物の状態
実施例 1	PoGE-A	1 / 3	—	可溶化ないし分散
" 2	PoGE-A	1 / 5.7	—	"
" 3	PoGE-B	1 / 4	—	"
" 4	PoGE-D	1 / 4	—	"
" 5	PoGE-A	1 / 5.7	—	"
" 6	PoGE-A	1 / 9	—	"
" 7	PoGE-B	1 / 9	—	"
" 8	PoGE-B	1 / 6	グリセリン	"
" 9	PoGE-B	1 / 9	グリセリン	"
" 10	PoGE-B	1 / 2	—	"
" 11	PoGE-B	1 / 1.5	—	"
比較例 1	PoGE-C	1 / 9	—	沈殿が生成
" 2	PoGE-E	1 / 5.7	—	"
" 3	PoGE-F	1 / 4	—	"

[0052] The following thing is clearer than an example 1 – an example 11, the example 1 of a comparison – the example 3 of a comparison.

(1) Even if the constituent with which the oil solubility matter concerning this invention was solubilized thru/or distributed forms soluble [uniform] thru/or a uniform dispersed system and it puts this system for a long period of time, oily water separation and precipitation generate and are stable (example 1 – example 11 reference).

(2) On the other hand, when the cloudy point of PoGE does not satisfy the requirements for claim 1, precipitate arises in a constituent and soluble [uniform] thru/or a uniform dispersed system is not formed again (example of comparison 1 reference).

(3) When the fatty acid which constitutes PoGE furthermore does not satisfy the requirements for claim 1, precipitate arises in a constituent and soluble [uniform] thru/or a uniform dispersed system is not formed (example 2 of comparison – example of comparison 3 reference).

[Translation done.]